

Form PTO-1390		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER TUR-124
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. <b>10/018785</b>
INTERNATIONAL APPLICATION NO. PCT/FI00/00562	INTERNATIONAL FILING DATE June 22, 2000	PRIORITY DATE CLAIMED June 22, 1999	
TITLE OF INVENTION: METHOD FOR THE ANALYSIS OF A NUTRITIVE PRODUCT			DATE: December 21, 2001
APPLICANT(S) FOR DO/EO/US Heikki KALLIO, Jyrki KAUPPINEN, Mari HAKALA and Mikko AHRO			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</p> <p>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))</p> <p style="margin-left: 20px;">a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</p> <p style="margin-left: 20px;">b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau.</p> <p style="margin-left: 20px;">c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</p> <p>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p style="margin-left: 20px;">a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> have been transmitted by the International Bureau.</p> <p style="margin-left: 20px;">c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p style="margin-left: 20px;">d. <input checked="" type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p> <p><b>Items 11. to 16. below concern other document(s) or information included:</b></p> <p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>14. <input type="checkbox"/> A substitute specification.</p> <p>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>16. <input checked="" type="checkbox"/> Other items or information:</p> <p style="margin-left: 40px;">a. WO 00/79265 (cover sheet only)</p> <p style="margin-left: 40px;">b. International Search Report (PCT/ISA/210)</p> <p style="margin-left: 40px;">c. International Preliminary Examination Report (PCT/IPEA/409)</p>			

U.S. Application No. <b>10/018785</b>		International Application No. PCT/FI00/00562		Attorney's Docket No. TUR-124	
17. [XX] The following fees are submitted:				CALCULATIONS	PTO USE ONLY
<b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b> Search Report has been prepared by the EPO or JPO. . . . . <b>\$890.00</b>  International preliminary examination fee paid to USPTO (37 CFR 1.482). . . <b>\$710.00</b>  No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) . . . . . <b>\$740.00</b>  Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO . . . . . <b>\$ 1040.00</b>  International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4). . . . . <b>\$ 100.00</b>				\$ 1040.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$ 1,040.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	9 - 20	0	x \$ 18.00	\$	
Indep. claims	1 - 3	0	x \$ 84.00	\$	
Multiple dependent claim(s) (if applicable)			+ \$280.00	\$	
TOTAL OF ABOVE CALCULATIONS =				\$ 1,040.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				\$ 520.00	
SUB TOTAL =				\$ 520.00	
Processing fee \$130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$ 520.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +				\$	
TOTAL FEES ENCLOSED =				\$ 520.00	
				Amount to be: refunded	\$
				charged	\$
a. [XX] A Credit Card Payment Form or check in the amount of \$ <u>520.00</u> to cover the above fee is enclosed. b. [ ] Please charge my Deposit Account No. <u>50-1258</u> in the amount of \$ _____ to cover the above fees. Two copies of this sheet are enclosed. c. [XX] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>50-1258</u> . Two copies of this sheet are enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to review (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO:					
James C. Lydon 100 Daingerfield Road Suite 100 Alexandria, Virginia 22314					
Signature _____ James C. Lydon Name _____ 30,082 Registration Number _____ 12/21/2001 Date _____					

10/018785

J003 Rec'd PCT/PTO 21 DEC 2001

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Heikki KALLIO et al.

Serial Number: New Application

Filed: December 21, 2001

For: METHOD FOR THE ANALYSIS OF A NUTRITIVE PRODUCT

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

December 21, 2001

Sir:

Prior to calculation of the filing fee, please amend this application as follows:

IN THE SPECIFICATION:

Page 1, between the title and the first heading, please insert the following:

This application is a U.S. national stage of International Application PCT/FI00/00562, filed June 22, 2000 and published on December 28, 2000 in the English language.

IN THE CLAIMS:

Please cancel claims 1-7 without prejudice or disclaimer.

Please add new claims 8-16 as follows:

8. (New) A method for the analysis of a nutritive product in a stage of treatment, in respect of a volatile or volatilizable compound present in or derived from said nutritive product, comprising

taking a sample of said nutritive product, optionally prehandled, and,

subjecting said sample to analysis, wherein the analysis is carried out by a direct inlet gas-phase Fourier transform infrared (FT-IR) spectroscopic method fast enough to make the result of the analysis available to the stage of treatment while the analyzed product still is in said stage of treatment.

9. (New) The method of claim 8, wherein a spectrum is obtained and compared to a reference spectrum or reference spectra in a spectral library in a data processing unit.

10. (New) The method of claim 8, wherein the analysis is carried out to determine one or several predetermined known compounds.

11. (New) The method of claim 8, wherein the analysis is carried out to determine whether a compound or mixture of compounds, which gives rise to a predetermined spectrum, is present in or derivable from the nutritive product.

12. (New) The method of claim 8, wherein the nutritive product is an animal carcass, and that the carcass is analyzed in respect of

off-odors, and that the analysis result is available before said carcass has reached a switch point for selection of track.

13. (New) The method of claim 12, wherein said carcass is a swine carcass on a conveyor in a slaughterhouse and said off-odors are at least one member of the group consisting of skatole and androstenone.

14. (New) A method for assorting a nutritive product in a stage of treatment, and subsequently directing the product to optimal use, comprising the steps of

- a) identifying pieces of the product,
- b) analyzing identified pieces of the product in respect of a volatile or volatilizable compound present in or derived from said product, according to the method of claim 8,
- c) labelling the analyzed pieces of the product according to the analysis results, and
- d) assorting the product into several classes for different uses.

15. (New) The method of claim 13, wherein the nutritive product is swine carcasses on a conveyor in a slaughterhouse, and that each carcass is identified, analyzed in respect of off-odors, labelled and directed on a suitable track at a switch point in the conveyor.

New U.S. Nat'l Stage Application  
PRELIMINARY AMENDMENT

**PATENT**

16. (New) The method of claim 15, wherein said off-odors are at least one member of the group consisting of skatole and androstenone.

**IN THE ABSTRACT:**

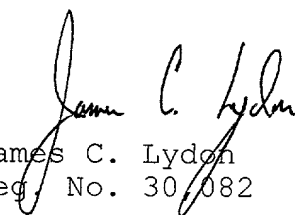
Please insert the attached Abstract into the application after the claims.

REMARKS

This Preliminary Amendment cancels claims 1-7, adds new claims 8-16, inserts a reference to International Application PCT/FI00/00562 into the specification, and presents a new Abstract based on the PCT Abstract. The new claims correspond to the original claims, but do not contain multiple dependencies. A version showing the changes made is attached as an Appendix. Claims 8-16 are pending.

It is not believed that any fee is required for entry and consideration of this Preliminary Amendment. Nevertheless, the Commissioner is authorized to charge our Deposit Account No. 50-1258 in the amount of any such fee deemed necessary for such entry and consideration.

Respectfully submitted,

  
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Enclosures:  
Appendix  
Abstract

**Appendix**  
**Version With Markings Showing Changes**

**IN THE SPECIFICATION:**

Page 1, the paragraph between the title and the first heading  
is new.

**IN THE CLAIMS:**

Claims 1-7 have been canceled.

Claims 8-16 are new.

**IN THE ABSTRACT:**

The attached Abstract is new.



**ABSTRACT OF THE DISCLOSURE:**

A method for the analysis of a nutritive product in a stage of treatment, in respect of a volatile or volatilizable compound present in or derived from the nutritive product. A sample of the nutritive product is taken, optionally prehandled and subjected to analysis. The analysis is carried out by a direct inlet FT-IR method fast enough to make the result of the analysis available to the stage of treatment while the analyzed product still is in the stage of treatment.

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JCO3 Rec'd REC/PTC 21 DEC 2001

## METHOD FOR THE ANALYSIS OF A NUTRITIVE PRODUCT

### FIELD OF THE INVENTION

This invention relates to a method for the analysis of a nutritive product in a stage of treatment, in respect of a volatile or volatilisable compound present in or derived  
5 from said product. The invention concerns also a method for assorting the nutritive products on the basis of the result obtained from the analysis.

### BACKGROUND OF THE INVENTION

The food industry encounters a variety of different kinds of unsolved problems involving volatile compounds. Thus there is a common need in various areas of  
10 food production for a fast method of analysis of volatile compounds. This need is evident e.g. during raw material breeding, cultivation, growing and selection, but also for process and product quality control, as well as hygiene and shelf life control.

The volatile compounds emitted or released should be analysed, as much as  
15 possible, both quantitatively and qualitatively, in their natural state. The information obtained would be useful and beneficial when optimising the safety, nutritive, profitability and sensory properties of the object to be analysed and to achieve a standard-quality raw material, process or product. At any step of the process, from raw material to product, composition of the volatile compounds may correlate with  
20 sensory properties of the raw material or product emitting said volatile compounds.

An example of such a problem to be solved within the food industry is the occurrence of boar taint as an off odour of pork. Boar taint is an occasionally existing off odour of pork (pig meat) caused by the presence of 3-methylindole

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(skatole), 5- $\alpha$ -androst-16-en-3-one (androstenone) and some other minor compounds.

Skatole is a microbial degradation product of amino acid tryptophan in the intestinal tract of pig. However, only male pigs accumulate indolic compounds, such as skatole, in their adipose tissues. Androstene steroids are, again, synthesized in testes and transported by blood circulation in adipose tissues and salivary glands. Thus, the boar taint precursors may exist in several organs in swine, especially in non-castrated boars.

Non-castrated, intact male pigs have higher fattening properties when compared with castrates and gilts. This is due to the effects of androgens. Boar production is thus an economically feasible approach. One limiting factor is that a small proportion of non-castrated male pigs emit the "boar-taint" off-odour during cooking and frying. Also on ethical reasons castration is less and less accepted in pork production.

The accumulation of skatole and androstenone in carcasses depend on several genetical and environmental factors. Production of androstenone depends on the age (sexual maturity) whereas skatole is mainly related to environmental conditions and dietary aspects.

At present, the assessment of existence of off-odorous compounds in carcasses is carried out by sampling and by analysing the sample in a laboratory. The most common methods applied are based on gas chromatographic (GC), high performance liquid chromatographic (HPLC), supercritical fluid chromatography (SFC), enzyme-linked immunoassay (ELISA) and colorimetric analysis of fat (adipose tissue), salivary glands and blood. All these methods require such an amount of sample preparation that none of them is an on-line method of analysis.

The disadvantages related hereto are the considerable time delay from the sampling until the result of the analysis is available. The analysis results are obtained at a time point when it is too late to use said results for assorting purposes. The analysis

results are thus mainly useful for documentation purposes. At present, there is no on-line method of analysis in use for this purpose.

## OBJECTS OF THE INVENTION

5 The aim of the present invention is to provide a method for the analysis of a nutritive product in a stage of treatment, in respect of a volatile or volatilisable compound present in or derived from said nutritive product, which method is fast enough to make the result of the analysis available to the stage of treatment while the analysed product still is in said stage of treatment.

10 The aim could e.g. be to provide a method for the fast analysis of off-odour compounds from swine carcass, wherein such compounds can be identified by an on-line analysis e.g. in an abattoir directly from the carcasses on a conveyor, after which the carcasses may be assorted according to their sensory quality. The swine carcasses can be assorted without delay in production in various quality classes, which is an economically profitable approach.

## 15 SUMMARY OF THE INVENTION

Thus, according to one aspect this invention concerns a method for the analysis of a nutritive product in a stage of treatment, in respect of a volatile or volatilisable compound present in or derived from said nutritive product, wherein a sample of said nutritive product is taken, optionally prehandled and subjected to analysis.

20 According to this invention, the analysis is carried out by a direct inlet gas-phase Fourier transform infra red (FT-IR) spectroscopic method fast enough to make the result of the analysis available to the stage of treatment while the analysed product still is in said stage of treatment.

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According to another aspect, this invention relates to a method for assorting a nutritive product in a stage of treatment, and subsequently directing the product to optimal use. The method is characterized by the steps of

- a) identifying pieces of the product,
- 5      b) analysing identified pieces of the product in respect of a volatile or volatilisable compound present in or derived from said product, according to the aforementioned analysis methods of this invention,
- c) labelling the analysed pieces of the product according to the analysis results, and
- 10      d) assorting the product into several classes for different uses.

#### BRIEF DESCRIPTION OF DRAWINGS

Figure 1 shows an FT-IR spectrum of an orange juice sample.

Figure 2 shows an FR-IR spectrum of a sample of coffee.

Figure 3 shows an FT-IR spectrum of a strawberry sample.

- 15      Figure 4 shows an FT-IR spectrum of skatole.

## DETAILED DESCRIPTION OF THE INVENTION

### Definition of terms and general description

The wording "nutritive product" shall be understood to mean any edible product for humans or animals, such as foods, feeds, food raw materials and feed raw materials of any kind. It shall also be understood to mean all products to be incorporated into food products such as food ingredients, food supplements as well as compounds comparable to food products such as nutraceuticals.

"Direct inlet gas-phase FT-IR spectroscopic method" shall be understood to mean a Fourier Transformed infrared spectroscopic method in which the sample gas is or volatiles are injected directly to the spectrometer's sample cell. FT-IR method does not in this context refer to FT-IR coupled with any chromatographic device.

"Stage of treatment" relates to any stage in which the product is handled before it has reached the end consumer or reached a point where no assorting of the product any longer can be carried out. This wording will thus, for example, cover field, transporting system, storages, factories, storehouses, kitchens, and spaces where the nutritive products are handled, processed or stored.

The analysed parameter is a volatile or volatilisable compound present in or derived from the nutritive product. According to this definition, the compound to be detected may be readily volatile, or it may be volatilisable upon certain measures such as suitable heating, gas rinsing or application of reduced pressure, for example. This definition covers also the preparation of a derivative of said compound, where said derivative is readily volatile or volatilisable as mentioned above.

The aim of the analysis is to detect and optionally also quantify volatile compound of the product, or to determine the susceptibility of the product to form volatile compounds, where said volatile compounds are biologically active, odorous, or

indicative, e.g. indicate that a product has been destroyed by micro-organisms, although that no off-odour can be noticed.

The aim of the analysis may be to pick out pieces of products releasing unwanted volatile compounds so that such pieces are prevented from reaching the batch of excellent quality. Instead, such pieces are directed to an appropriate use, or, in the worst case, destroyed.

On the other hand, the aim of the analysis may be to pick out pieces of products releasing highly desirable volatile compounds so that such pieces can be classified as products of particularly good quality.

If the volatile compounds analysed are quantified, then the product can be divided into many classes depending on the concentration of the volatile compound.

The sampling can be carried out manually or automatically.

It is essential that the analysis is carried out by direct inlet gas-phase FT-IR method fast enough to make the result of the analysis available to the stage of treatment while the analysed product still is in said stage of treatment. The acceptable delay from sampling until delivery of analysis results depends on the stage of treatment in question. In a rapid transport conveyor, the delay may be seconds or parts thereof. If the stage of treatment is storage, then the acceptable delay may be much longer. Anyway, it is essential that the result is delivered in sufficiently good time so that the result obtained can be used for decision making, not only for documentation, in said stage of treatment.

The spectrum obtained is preferably compared to reference spectra in a spectral library in a data processing unit.

According to one embodiment, the analysis is carried out to determine one or several predetermined known compounds.

According to an alternative embodiment, the analysis is carried out to determine whether a compound or mixture of compounds, which gives rise to a predetermined spectrum, is present in or derivable from the nutritive product.

The analysis method according to this invention is particularly useful for the investigation of an animal carcass, especially a swine carcass on a conveyor in a slaughterhouse, wherein the carcass is analysed in respect of off-odours, especially skatole and/or androstenone. When the analysis result is available before the carcass has reached a switch point for selection of track, a carcass with too high concentration of the unwanted volatile compound can be prevented from reaching the line for first class swine meat.

Based on the use of the analysis method according to this invention, it is possible to assort a nutritive product in a stage of treatment, and to subsequently direct the product to optimal use. The assorting step can be carried out manually or automatically, depending on the acceptable time delay in the said stage of treatment.

The choice of the appropriate use may be guided by, for example, safety, nutritional, economical, ethical, sensory or other reasons. Pieces of the products are identified (i.e. equipped with an identification number or the like), analysed, labelled according to the result from the analysis, and finally assorted according to the label, into several predetermined classes destined for different uses.

In case the product to be studied and assorted is an animal carcass, e.g. a swine carcass on a conveyor in a slaughterhouse, then each carcass is identified, analysed in respect of off-odours, especially skatole and/or androstenone, labelled and directed on a suitable track at a switch point in the conveyor.

If the product to be studied and assorted is fruit, vegetables, and other products comprising a great amount of pieces, then it may be sufficient to identify, analyse and label just a representative amount of pieces of the product.

The invention is illustrated more in detail by the following non-limiting examples.



### Example 1

The slaughtered pigs on a conveyor are individually marked so that they can be identified manually or automatically. A sample of the carcass, e.g. a biopsy of the neck fat, will be taken. The sample is then transferred into one of the Fourier-  
 5 transform infra red (FT-IR) analysers. The sample is treated in a proper way to introduce the volatile compounds to be analysed into the measuring unit, e.g. heating the sample in a suitable way. The results are handled in a data process unit.

After data processing the final rating information together with the identification code will be sent to the switch point(s) of the conveyor to direct the carcass on the  
 10 selected track.

### Example 2

This example describes a similar analysis and assorting process as that of Example 1, using a low resolution FT-IR analyser GASMET™ combined with CALCMET™ multi-component analysis system to analyse the content of skatole in  
 15 the biopsy taken from neck fat of the carcass, which sample is heated and the volatiles introduced into the analyser. An FT-IR spectrum of skatole (Fig. 4) measured by GASMET™ is used as the library spectrum for CALCMET™, which spectrum does show impurities, e.g. water and carbon dioxide.

### Example 3

20 FT-IR spectra of nutritive products are typically highly specific as demonstrated by Fig. 1–4. Fig. 1 is a FT-IR spectrum of a sample of orange juice showing absorbance versus wave number. Correspondingly Fig. 2 is a FR-IT spectrum of a sample of coffee and Fig. 3 of strawberry.

Table 1 below further demonstrates that nutritive products can be characterized based on their volatiles. Different varieties of strawberries definitely show a different profile of volatiles.

**Table 1** Significance of differences ( $p < 0.05$ ) of six different strawberry varieties grown in 1998. Different letters in the columns indicate the statistical differences between strawberry varieties in relative amount of certain volatile compounds determined from the vapour phase of strawberries.

Strawberry variety	Acetone	Ethyl butanote	Ethyl acetate	Ethanol	Methanol	Butane-2,3-dione	Acetaldehyde	Pentan-2-one	Heptan-2-one	cis-3-hexenol	Hydroxyfuranone <sup>1</sup>	Methyl butanoate	Methoxyfuranone <sup>2</sup>
Senga	B	B	A	A	A	C	AB	C	B	A	B	A	A
Jonsok	B	C	BC	A	AB	A	B	D	A	A	B	A	A
Korona	A	A	BC	A	AB	B	C	C	B	A	B	A	A
Polka	A	A	CD	A	AB	C	BC	A	B	A	C	A	A
Honeoye	B	A	AB	A	B	D	D	A	C	A	A	A	A
Bounty	A	A	D	A	AB	BC	C	B	B	A	BC	A	A

<sup>1</sup> = 2,5-dimethyl-4-hydroxy-3(2H)-furanone, <sup>2</sup> = 2,5-dimethyl-4-methoxy-3(2H)-furanone

It will be appreciated that the methods of the present invention can be incorporated in the form of a variety of embodiments, only a few of which are disclosed herein. It will be apparent for the specialist in the field that other embodiments exist and do not depart from the spirit of the invention. Thus, the described embodiments are illustrative and should not be construed as restrictive.

## CLAIMS

1. A method for the analysis of a nutritive product in a stage of treatment, in respect of a volatile or volatilisable compound present in or derived from said nutritive product, wherein a sample of said nutritive product is taken, optionally prehandled and subjected to analysis, **characterized** in that the analysis is carried out by a direct inlet gas-phase Fourier transform infra red (FT-IR) spectroscopic method fast enough to make the result of the analysis available to the stage of treatment while the analysed product still is in said stage of treatment.
2. The method according to claim 1, **characterized** in that the spectrum obtained is compared to a reference spectrum or reference spectra in a spectral library in a data processing unit.
3. The method according to claim 1 or 2, **characterized** in that the analysis is carried out to determine one or several predetermined known compounds.
4. The method according to claim 1, 2 or 3, **characterized** in that the analysis is carried out to determine whether a compound or mixture of compounds, which gives rise to a predetermined spectrum, is present in or derivable from the nutritive product.
5. The method according to any of the foregoing claims, **characterized** in that the nutritive product is an animal carcass, especially a swine carcass on a conveyor in a slaughterhouse, and that the carcass is analysed in respect of off-odours, especially skatole and/or androstenone, and that the analysis result is available before said carcass has reached a switch point for selection of track.

6. A method for assorting a nutritive product in a stage of treatment, and subsequently directing the product to optimal use, **characterized** by the steps of

- a) identifying pieces of the product,
- b) analysing identified pieces of the product in respect of a volatile or volatilisable compound present in or derived from said product, according to any of the methods of claims 1 to 6,
- c) labelling the analysed pieces of the product according to the analysis results, and
- d) assorting the product into several classes for different uses.

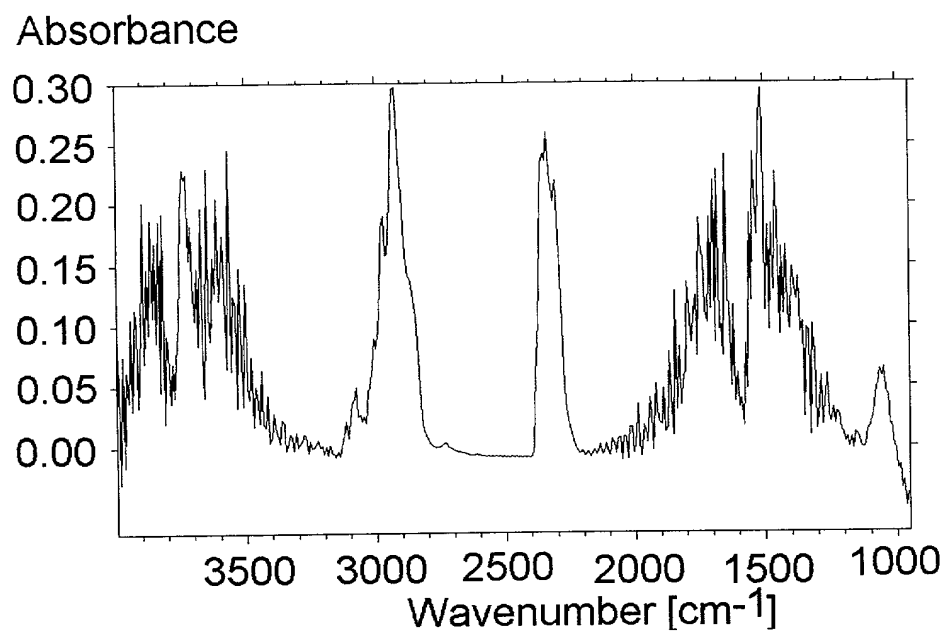
7. The method according to claim 6, **characterized** in that the nutritive product is swine carcasses on a conveyor in a slaughterhouse, and that each carcass is identified, analysed in respect of off-odours, especially skatole and/or androstenone, labelled and directed on a suitable track at a switch point in the conveyor.

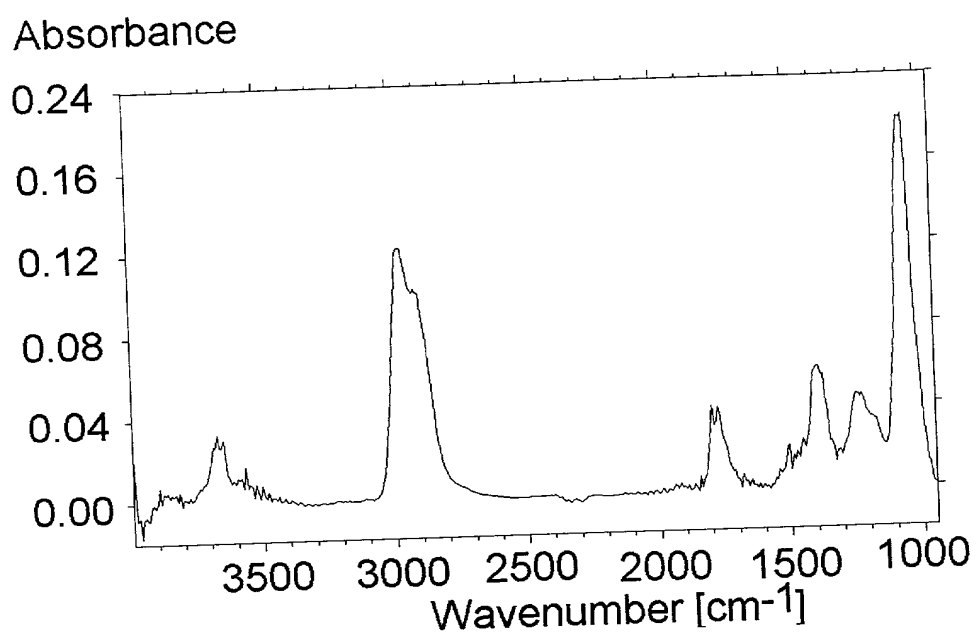
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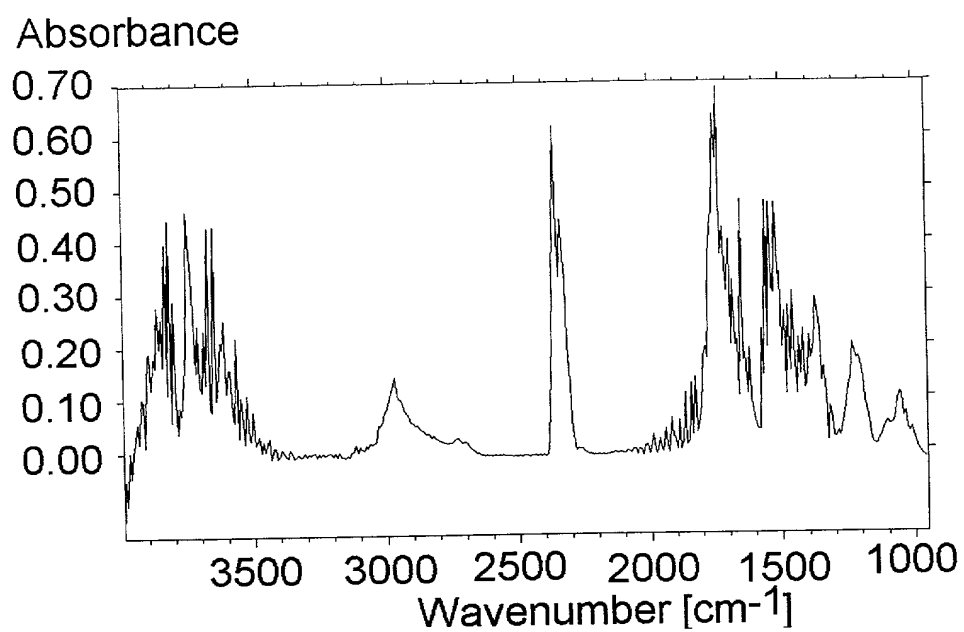
## ABSTRACT

The invention relates to a method for the analysis of a nutritive product in a stage of treatment, in respect of a volatile or volatilisable compound present in or derived from said nutritive product. A sample of said nutritive product is taken, optionally prehandled and subjected to analysis. According to this invention, the analysis is carried out by a direct inlet FT-IR method fast enough to make the result of the analysis available to the stage of treatment while the analysed product still is in said stage of treatment.

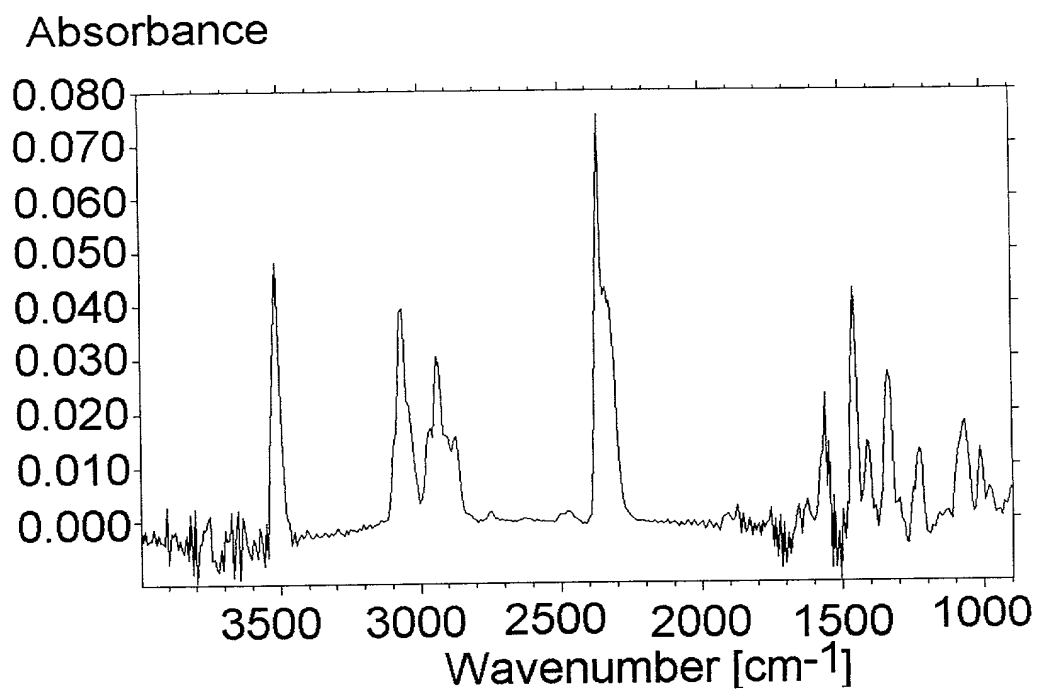
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**Fig. 1**

**Fig. 2**

**Fig. 3**



**Fig. 4**

## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

TURUN PATENTTITOIMISTO OY  
P.O. Box 99  
FIN-20521 Turku  
FINLANDE

Date of mailing (day/month/year)

21 December 2001 (21.12.01)

Applicant's or agent's file reference

ÅP2983

## IMPORTANT NOTIFICATION

International application No.

PCT/FI00/00562

International filing date (day/month/year)

22 June 2000 (22.06.00)

1. The following indications appeared on record concerning:

☒

the applicant

☒

the inventor

☐

the agent

☐

the common representative

Name and Address

AHRO, Mikko  
Yliopistonkatu 12 B A 10  
FIN-20100 Turku  
Finland

State of Nationality

FI

State of Residence

FI

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐

the person

☐

the name

☒

the address

☐

the nationality

☐

the residence

Name and Address

AHRO, Mikko  
Aleksis Kiven katu 48 A 14  
FIN-00510 Helsinki  
Finland

State of Nationality

FI

State of Residence

FI

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒

the receiving Office

☐

the designated Offices concerned

☐

the International Searching Authority

☒

the elected Offices concerned

☐

the International Preliminary Examining Authority

☐

other:

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

N. Wagner

Telephone No.: (41-22) 338.83.38

20040528001

Docket No. TUR-124

**Declaration For U.S. Patent Application**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled (INSERT TITLE) Method for the analysis of a nutritive product

the specification of which

(Check one of  
1, 2, or 3.)

1.    is attached hereto.
2. x was filed on 22 June 2000 as  
International PCT Application Serial No. PCT/FI00/00562  
and was amended on 21 December 2001  
(if applicable)
3.    was filed on \_\_\_\_\_ as  
U.S. Application Serial No. \_\_\_\_\_  
and was amended on \_\_\_\_\_  
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application for which priority is claimed:

(List prior foreign applications.)	<u>991417</u> (Number)	<u>Finland</u> (Country)	<u>22/06/99</u> (Day/Month/Year Filed)	Priority Claimed <u>x</u> Yes <u>  </u> No
	<u>          </u> (Number)	<u>          </u> (Country)	<u>          </u> (Day/Month/Year Filed)	<u>  </u> Yes <u>  </u> No

   See attached list for additional prior foreign applications

I hereby claim the benefit under Title 35, United States Code, §120, of any United States application listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56, which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status)
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I hereby appoint as principal attorney James C. Lydon, Reg. No. 30,082

Please direct all communications to the following address:

James C. Lydon  
Attorney at Law  
100 Daingerfield Road, Suite 100  
Alexandria, Virginia 22314  
Telephone: (703) 838-0445  
Facsimile: (703) 838-0447

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of first or sole inventor: Heikki Kallio

Inventor's Signature: \_\_\_\_\_ Date: 14.2.2002

Residence: Tammikuja 3, FIN-21110 Naantali, Finland

Citizenship: Finnish

Post Office Address: same as residence

Full name of second inventor: Jyrki Kauppinen

Inventor's Signature: Jyrki Kauppinen Date: 22.2.02

Residence: Kyypellontie 1, FIN-21350 Ilmarinen, Finland

Citizenship: Finnish

Post Office Address: same as residence

Full name of third inventor: Mari Hakala

Inventor's Signature: Mari Hakala Date: 14.2.2002

Residence: Pitkäkoskentie 25, FIN-25260 Vaskio, Finland

Citizenship: Finnish

Post Office Address: same as residence

Full name of fourth inventor: Mikko Ahro

Inventor's Signature: Mikko Ahro Date: 19.2.2002

Residence: Aleksis Kiven katu 48 A 14, FIN-00510 Helsinki, Finland

Citizenship: Finnish

Post Office Address: same as residence

Full name of fifth inventor: \_\_\_\_\_

Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Residence: \_\_\_\_\_

Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of sixth inventor: \_\_\_\_\_

Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Residence: \_\_\_\_\_

Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of seventh inventor: \_\_\_\_\_

Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Residence: \_\_\_\_\_

Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

Full name of eighth inventor: \_\_\_\_\_

Inventor's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Residence: \_\_\_\_\_

Citizenship: \_\_\_\_\_

Post Office Address: \_\_\_\_\_

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